

initial and return a copy of the PTO-1449 form, which accompanied that paper, indicating such consideration.

Claims 13-25, 38-50, 63-75, 83, and 85-138 are now presented for consideration. Claims 13, 38-41, 63-66 and 83 are independent. Claims 13-16 have been amended to clarify features of the subject invention, while claims 126-138 have been added to recite additional features of the subject invention. Support for these changes and claims can be found in the original application as filed. Therefore, no new matter has been added.

Applicants note with appreciation that claims 38-50, 63-75, 83, 85-99 and 104-125 have been indicated as being allowable. In addition to these claims being allowable, Applicants submit that claims 13-25, 100-103, 113-116 and 126-129 patentably define features of the subject invention.

Applicants request favorable reconsideration and withdrawal of the rejections set forth in the above-noted Office Action.

Claims 13-25 and 100-103 were rejected under 35 U.S.C. § 102 as being anticipated by any one of U.S. Patent No. 5,392,094 to Kudo, U.S. Patent No. 5,863,712 to Von Bunau et al. or U.S. Patent No. 5,467,166 to Shiraishi. Applicant submit that the cited art does not teach many features of the present invention, as previously recited in claims 13-25 and 100-103. Therefore, these rejections are respectfully traversed.

In one aspect of the invention, independent claim 13 recites an exposure apparatus that includes first exposure means for illuminating a predetermined mask with light of a predetermined wavelength under a first mask-illumination condition, to print a first pattern

on a predetermined exposure region and second exposure means for illuminating the predetermined mask with light of the predetermined wavelength under a second mask-illumination condition, different from the first mask-illumination condition, to print a second pattern on the predetermined exposure region. A first exposure by the first exposure means and a second exposure by the second exposure means are carried out prior to a development process.

In the present invention recited in independent claim 13, the term “mask-illumination condition” is intended to refer to a condition regarding illumination of a mask or mask pattern. Thus, this term is intended to refer to an illumination condition related to an optical system at a light source side, for example, of the mask, as opposed to being related to an optical system between the mask and the wafer, such as a projection optical system. Accordingly, generally speaking, even if a filter used in a projection optical system is replaced by another, Applicants submit that such an arrangement is not related to a mask-illumination condition as is intended by the present invention recited in independent claim 13. That being said, Applicants submit that the cited art does not teach or suggest such features of the present invention as recited in independent claim 13.

The Kudo patent shows an exposure apparatus having a first aperture variable means and a second variable aperture stop. The first aperture variable means is provided in an illumination optical system, namely, between a light source and a mask pattern. The second variable aperture stop is provided in a projection optical system, namely, between the mask pattern and the workpiece (wafer) to be exposed.

Applicants submit that the Kudo patent does not teach or suggest anything regarding performing an exposure by first exposure means and another exposure by second exposure means, prior to a development process, in the manner of the present invention recited in independent claim 13. More specifically, Applicants submit that the Kudo patent does not teach or suggest performing such first and second exposures to one and the same mask, for example, under different mask-illumination conditions, that is, a first mask-illumination and a second mask-illumination condition, different from the first mask-illumination condition, prior to a development process, in the manner of the present invention recited in that claim.

Applicants further submit that the remaining art is likewise deficient.

The Von Bunau et al. patent shows an exposure apparatus in which a filter, provided inside a projection optical system between a mask and a wafer, is changed by another. The Shiraishi patent is similar to the Von Bunau et al. patent in showing an exposure apparatus, in which, at a pupil position of a projection optical system, a structure is provided for partially changing the direction of polarization of light or for changing a focal point position of the projection optical system. This structure, however, is inside the projection optical system, and, therefore, does not function to change a mask-illumination condition.

Accordingly, Applicants submit that the Von Bunau et al. and Shiraishi patents likewise do not teach or suggest performing first and second exposures to a mask, prior to a development process under first and second mask-illumination conditions, different from each other, in the manner of the present invention recited in independent claim 13.


For the foregoing reasons, Applicants submit that the present invention, as recited in independent claim 13, also is patentably defined over the cited.

Dependent claims 14-25, 100-103, 113-116 and 126-129 also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in their respective independent claims. Further individual consideration of these dependent claims is requested.

Favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action and an early Notice of Allowance are also requested.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,

  
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**APPENDIX A**

**IN THE CLAIMS**

13. (Amended) An exposure apparatus, comprising:

first exposure means for illuminating a predetermined mask with light of a predetermined wavelength under a first mask-illumination condition, to print a first pattern on a predetermined exposure region; and

second exposure means for illuminating the predetermined mask with light of the predetermined wavelength under a second mask-illumination condition, different from the first mask-illumination condition, to print a second pattern on the predetermined exposure region,

wherein a first exposure by said first exposure means and a second exposure by said second exposure means are carried out prior to a development process.

14. (Amended) An exposure apparatus[, comprising:] according to Claim 13, wherein, under the first mask-illumination condition, the

[first exposure means for illuminating a] predetermined mask is illuminated with a first sigma, and, under the second-mask illumination condition, [to print a first pattern on a predetermined exposure region; and

second exposure means for illuminating] the predetermined mask is illuminated with a second sigma, different from the first sigma[, to print a second pattern on the predetermined exposure region,

wherein a first exposure by said first exposure means and a second exposure by said second exposure means are carried out prior to a development process].

15. (Amended) An exposure apparatus[, comprising:] according to Claim 13, wherein under the first mask-illumination condition, the

[first exposure means for illuminating a] predetermined mask illuminated with [light of] a first numerical aperture [to print a first pattern on a predetermined exposure region; and

second exposure means for illuminating] , and, under the second mask-illumination condition, the predetermined mask is illuminated with [light of] a second numerical aperture, different from the first numerical aperture[, to print a second pattern on the predetermined exposure region,

wherein a first exposure by said first exposure means and a second exposure by said second exposure means are carried out prior to a development process].

16. (Amended) An exposure apparatus[, comprising:] according to Claim 13, wherein, under the first mask-illumination condition, the

[first exposure means for obliquely illuminating a] predetermined mask [to print a first pattern on a predetermined exposure region; and

second exposure means for perpendicularly illuminating] is illuminated with light being obliquely incident thereon, and, under the second mask-illumination condition, the predetermined mask [to print a second pattern on the predetermined exposure region,

wherein a first exposure by said first exposure means and a second exposure by said second exposure means are carried out prior to a development process] is illuminated with light being perpendicularly incident thereon.